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Docket No. 60,469-053
OT-4987

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w/Appeal Brief
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Pitts
Serial No.:	09/970,587
Filed:	10/04/2001
Group Art Unit:	3682
Examiner:	Charles, Marcus
Title:	ELEVATOR BELT ASSEMBLY WITH NOISE REDUCING GROOVE ARRANGEMENT

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The Notice of Appeal in this application was filed on November 3, 2003. Appellant now submits its brief in the above-referenced application. A Credit Card Payment Form in the amount of $440.00 is enclosed for payment of the appeal fee and one month extension. The Commissioner is authorized to charge Deposit Account No. 50-1482 in the name of Carlson, Gaskey & Olds for any additional fees or credit the account for any overpayment.

02/12/2004 DTESSEM1 00000042 09970587
01 FC:1402 330.00 OP
02 FC:1251 110.00 OP

Real Party in Interest

Otis Elevator Company is the real party in interest.

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GROUP 3600

Related Appeals and Interferences

There are no related appeals or interferences.

Status of the Claims

Claims 15, 16, 19 and 21-27 stand finally rejected. Claims 15, 16, 19, 21-24 and 26 were rejected under 35 U.S.C. §103 over two references. Claim 25 is rejected under 35 U.S.C. §103 based on a single reference. Claim 27 is rejected under 35 U.S.C. §103 based upon a combination of three references.

Status of Amendments

There are no unentered amendments.

Summary of the Invention

Elevator systems that include suspended cabs and counterweights typically have several load bearing members that support the weight of the cab and counterweight. The load bearing members in traditional systems have been steel ropes. More recently, flat belt technologies have been introduced. As the ropes or belts move around sheaves, the elevator cab carries passengers to the various levels within a building, for example (page 1, paragraph 2).

During the manufacturing process of elevator belts, supporting cords while applying a jacket over the cords results in grooves formed in the jacket surface on at least one side of the belt. Such grooves are not intended for belt performance, but rather are an unavoidable result of some manufacturing techniques. Such grooves contact the sheaves as the belt moves, which can create an annoying, audible tone, especially at steady state frequencies. The initial contact between the grooves and the sheaves as the belt moves toward the sheave is believed to be a significant contributor to such noise. Additionally, cord distortion sometimes occurs in typical manufacturing

processes at the same location as the grooves in the belt surface. Such cord distortions are believed to contribute to noise generation (page 1, paragraph 3; page 2, paragraph 6).

In a disclosed example embodiment shown in Figure 4, an elevator belt has a jacket 24b that includes a plurality of grooves 56' on at least one side of the jacket 24b. The grooves result from some manufacturing processes in a known manner. In the example embodiment of Figures 4 and 6, the grooves are spaced apart different distances so that there are different spacings between various grooves. For example, a first spacing 62 separates two of the grooves 56'. A different spacing 64 separates the next two grooves. By altering spacings between adjacent grooves, the noise component caused by contact of the belt assembly with other elevator system components, such as the sheaves, during system operation is spread over a broader range of frequencies. Steady state frequencies of noise are avoided and that eliminates the potential for an audible, annoying tone during elevator system operation (par. 23, 24, 26).

Figures 4 and 6 illustrate example embodiments where the grooves are spaced apart using different spacings and the grooves are aligned at an oblique (i.e., non-perpendicular) angle relative to a longitudinal axis of the belt. In the example of Figure 6, the grooves have individual line segments at different oblique angles (par. 31, 33).

Figure 7 schematically shows a method of making an elevator belt that includes cord supports 110 that support the cords 22 as they are fed through machinery 100 where the jacket material is applied to the cords. The cord supports 110 are spaced apart using different spacings and have a configuration that results in the desired alignment and shape of grooves or groove segments on the belt (par. 36, 38).

The claimed invention provides superior performance with reduced noise because of the combination of different spacings between grooves and the oblique arrangement of the grooves on

the belt. This arrangement reduces the possibility for generating audible tones that otherwise may result from the contact between the grooves and the associated cord segments, which can become distorted during the manufacturing process as noted above, on the one hand and a sheave on the other hand as the corresponding portion of the belt approaches and contacts the sheave.

Issues

Whether the final rejections under 35 U.S.C. §103 are proper where there is no motivation to combine the references because the proposed combination goes against the express teachings of the primary reference and the feature of the secondary reference relied upon by the Examiner is intended to solve a problem that has no relevance to the primary reference.

Grouping of Claims

Claims 15, 16, 19, 21, 23, 24, 26 and 27 stand or fall together for purposes of this appeal.

Claims 22 and 25 stand or fall together but separately from the other claims for purposes of this appeal.

Argument

INTRODUCTION

The claims are not obvious because there is no motivation to combine the prior art as suggested by the Examiner. Additionally, even if the combination could be made, the result is not the same as the invention of at least some of Applicant's claims.

THE CITED REFERENCES

A. Japanese Patent Application No. 8-247221 ("the *Kokai* reference")

The *Kokai* reference discloses a flat belt that has tensile core wires 12 embedded in a belt main body 11. Grooves 13 are arranged ***at equal intervals*** along the length of the belt and result from the process of keeping the core wires 12 at prescribed positions in the belt main body 11. The *Kokai* reference repeatedly teaches that the grooves are equally spaced along the belt (see, e.g., the "Constitution" section, claim 1, paragraphs 2, 4, 7 and 14). In each instance, the *Kokai* reference mentions spacing the grooves at equal intervals in connection with teaching how to maintain the tensile core wires in the "prescribed positions." It appears that equal spacing is required for the *Kokai* reference teachings to achieve the intended result of having the tensile core wires in a prescribed alignment. If one were to modify the teachings of the *Kokai* reference to eliminate the equal intervals, controlling the cord position may not be possible.

The grooves in the *Kokai* reference are an unavoidable result of the belt manufacturing process because the tensile core wires have to be supported in accurately located positions within the belt main body. The grooves are not intentionally put there as a surface feature.

The *Kokai* reference teaches forming the grooves "as linear oblique grooves having a certain angle of inclination with respect to the axis of rotation or generating line of the rotation drive." (Paragraph 4). This orientation provides that the *Kokai* reference linear oblique grooves "make contact with the rotation driver, such as a pulley, at a contact spot, which is very nearly a point, on the axis of rotation or generating line of the rotation driver. Therefore, the impact noise caused by contact between the rotation driver and the linear oblique grooves can be minimized or prevented." (Paragraph 5).

It is important to note that the arrangement of grooves in the *Kokai* reference is intended to address the potential noise generation that occurs as the grooves contact (i.e., as they approach) the surface of the pulley 20. It is also important to note that there is no contact between the side edges of the belt in the *Kokai* reference and the pulley. Rather, only the flat side of the belt contacts the pulley as it rotates around the pulley.

B. United States Patent No. 4,976,662 ("the *Miranti* reference")

The *Miranti* reference discloses a significantly different type of belt arrangement compared to that of the *Kokai* reference. In this example, a generally V-shaped arrangement of longitudinal grooves or side edges of the belt are configured to cooperate with generally V-shaped notches of a ribbed surface on a rotatable pulley.

The belt of the *Miranti* reference includes different sections. A compression section 22 has an inner surface that cooperates with the ribbed configuration of the pulley 30. Transverse projections 27 and grooves 28 are intentionally molded into, cut into or otherwise formed in the compression section 22 to provide flexibility to the belt of the *Miranti* reference. (Column 3, lines 43-45 and 45-55). The grooves 28 do not have anything to do with forming the load carrying section 23.

The *Miranti* reference teaches using different spacings between the grooves 28 to reduce noise in a situation where "opposed side edge means" engage angled pulley surfaces. (Column 4, lines 15-25). The *Miranti* reference incorporates U.S. Patent No. 4,264,314 as explaining the motivation for doing so. The '314 patent, which is not separately of record in this application, teaches:

> The cause of the generation of noises by the cog type V-belt is as follows: at the time that the cog type V-belt received in the pulley groove ***starts to move away from the pulley*** the belt is positioned deep in the pulley groove, because of the belt tension normally applied

> thereto. Under this condition, the belt is forcibly released from the pulley. In the case of a cog belt, since the belt has grooves in the lower surface engaging the pulley, the belt is intermittently rather than continuously, released from the pulley. At the same time, the pulley side surfaces are wiped by the belt side surfaces, thus generating squeaky sounds. Since this operation is repeatedly carried out, noises result.
>
> * * *
>
> (1) The volume of sound generated at a position ***where the belt leaves the pulley*** is a maximum. (Emphasis added).

(Column 1, lines 28-40 and 47-48 of the '314 patent).

Accordingly, *Miranti, Jr.* provides grooves for a completely different reason than the resulting grooves in the *Kokai* reference. *Miranti, Jr.* adds the grooves 28 to achieve flexibility. Moreover, the *Miranti, Jr.* arrangement is intended to reduce noise generation as a V-shaped cog belt ***exits*** a corresponding V-shaped pulley. There is no teaching or suggestion within the *Miranti* reference that the spacings used in that reference have any impact on noise generation as the grooves move into contact with the pulley. In fact, the *Miranti* reference teaches the opposite.

By contrast, the *Kokai* reference does not have any teaching of any noise as the *Kokai* belt exits the pulley but teaches the opposite in attempting to minimize noise generation when the *Kokai* reference grooves first contact the pulley. This is not surprising since the *Kokai* reference does not include a V-shaped cog belt nor a V-shaped pulley.

C. United States Patent No. 4,605,389 ("the *Westhoff* reference").

The Examiner relies upon the *Westhoff* reference as teaching a belt made of polyurethane elastomer.

THE REJECTIONS UNDER 35 U.S.C. §103 ARE IMPROPER

The combination of references cannot be made because there is no legal motivation for doing so. It is axiomatic that there must be a motivation to make a combination. Where a proposed combination goes against the express teachings of the primary reference and the benefit taught by the secondary reference has no applicability to the arrangement of the primary reference, there is no motivation and no *prima facie* case of obviousness.

The Examiner proposes to combine the *Kokai* reference with the *Miranti* reference. As discussed above, the *Kokai* reference explicitly and repeatedly requires ***equal spacing*** between grooves "in order to embed tensile core wires at prescribed positions in the belt main body." The Examiner's proposal to substitute unequal spacing as shown in the *Miranti* reference is directly contrary to this teaching and appears that it would defeat the intended result of the *Kokai* reference. The direct link between the equal spacing and the discussion of maintaining the cords in a prescribed position in the *Kokai* reference strongly suggests that the equal spacing is required during the belt manufacturing process to keep the cords aligned as desired. There is nothing within the art that suggests going directly against the express teachings of the *Kokai* reference. Therefore, the combination cannot be made.

Further, when one considers the problem addressed by the *Kokai* reference and that addressed by the feature of the *Miranti* reference chosen by the Examiner, one is lead to the conclusion that the skilled artisan would not look to *Miranti* to solve a problem in *Kokai*. The *Kokai* reference is intended to reduce noise generation that occurs as the grooves approach and contact the flat surface on the pulley 20. There is no discussion of any possible noise generation as the belt surface separates from the pulley surface 20.

The *Miranti* reference, on the other hand, expressly teaches "through incorporation by reference" that it is the separation between the side surfaces of the V-shaped belt and the side surfaces of the V-shaped pulley where noise generation occurs. That is the only reason for the *Miranti* reference's unequal spacing. Because the source of noise in the *Miranti* reference is non-existent in the *Kokai* reference, there is no motivation for looking to the teachings of the *Miranti* reference to solve any possible problems encountered using the *Kokai* reference. In other words, because the noise generation in the *Kokai* reference occurs in an opposite manner than that which occurs in the *Miranti* reference there is no compatibility between the two teachings. When one further considers that the interaction between the side surfaces in the *Miranti* reference which generate noise have no correspondence in the *Kokai* reference (there is no side surface contact in the arrangement of the *Kokai* reference, as can be appreciated from Figures 1, 2 and 5), there is no suggestion that the teachings of the *Miranti* reference will have any benefit in the context of the *Kokai* reference.

The *Kokai* reference and the *Miranti* reference take different approaches to solve problems that occur along different surfaces at opposite ends of the interaction between a belt and a rotating member. Given the significant differences between the two arrangements, there is no suggestion to combine their teachings absent hindsight reasoning based upon Applicant's disclosure. There is nothing within the *Kokai* reference or the *Miranti* reference that in any way suggests making the combination that is first presented by Applicant's disclosure. Without Applicant's teachings, it is difficult to see how one looking at *Kokai* and *Miranti* would be led to attempt to combine the two. One (*Kokai*) expressly teaches using equal spacing and attempts to reduce noise occurring during initial contact between a groove and a flat surface on a pulley. The other (*Miranti*) attempts to

reduce noise as a belt leaves a pulley and is focused on noise generation from the interaction of side surfaces, which have no correspondence in the *Kokai* arrangement.

The further addition of the *Westhoff* reference (when rejecting claim 27) does not cure the defect in the proposed initial combination. Because there is no motivation for making the combination, there is no *prima facie* case of obviousness.

Therefore, none of the pending claims can be considered obvious.

CLAIMS 15, 16, 19, 21, 23, 24, 26 AND 27 ARE ALLOWABLE

Without the necessary motivation to combine, there is no *prima facie* case of obviousness. The claims rejected using the improper combination of *Kokai* and *Miranti, Jr.* cannot be considered obvious.

CLAIMS 22 AND 25 ARE ALLOWABLE

Claims 22 and 25 are separately patentable because even if the combination could be made, it is not the same result as the claimed invention. These claims recite arrangements as shown in Figure 6, for example, where each groove comprises a plurality of line segments and at least two of the segments are at different oblique angles. Even if the combination of *Kokai* and *Miranti* could be made, neither teaches having grooves arranged as claimed in claims 22 and 25. Accordingly, these claims are separately patentable. Even the Examiner's improper combination does not result in the claimed invention.

The rejection of claim 25 based upon the *Kokai* reference alone fails to establish a *prima facie* case of obviousness. The Examiner contends that it would be "a matter of design choice" to provide a plurality of groove segments at different oblique angles based upon the *Kokai* reference.

There is nothing within that reference that in any way suggests using multiple line segments. In fact, the *Kokai* reference appears to teach the opposite. When discussing providing "single point" contact between the *Kokai* grooves 13 and the pulley 20, the *Kokai* reference teaches that the single point contact is what provides the noise-reducing qualities of that arrangement. If one were to add multiple segments, the teachings of the *Kokai* reference indicate that would increase the number of contact points and, in theory at least, increase the amount of noise generation. It does not follow that one reading the *Kokai* reference would be led to believe that multiple line segments are desirable. The Examiner's proposed "design choice" appears to be contrary to the teachings of the *Kokai* reference and, therefore, there is no motivation for modifying the reference in that manner.

Moreover, *Kokai* alone teaches equal spacing and nothing in that reference could be construed to suggest the varying longitudinal spacing of claim 25. The proposed "design choice" falls short and does not result in the claimed arrangement.

CONCLUSION

There is no proper legal motivation for making the improper combination proposed by the Examiner. Therefore, there is no *prima facie* case of obviousness and none of the claims can be considered obvious. Further, the combination, which cannot be made, does not result in the arrangement claimed in at least two of Applicant's claims. At a minimum, claims 22 and 25 must be allowed.

Applicant respectfully submits that all rejections should be reversed.

Respectfully solicited,

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February 3, 2004
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CERTIFICATE OF MAIL

I hereby certify that the enclosed **Appeal Brief (in triplicate) and Fees** is being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to Mail Stop Appeal Brief - Patents, Commissioner For Patents, P. O. Box 1450, Alexandria, VA 22313-1450 on February 3, 2004.

Theresa M. Palmateer

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APPENDIX OF CLAIMS

15. A method of making an elevator belt having a plurality of cords within a jacket, comprising the steps of:

(a) aligning the plurality of cords in a selected arrangement; and

(b) applying the jacket to the cords while supporting the cords such that the applied jacket includes a plurality of longitudinally spaced grooves formed in the jacket where the grooves are

disposed at least in part at an oblique angle to a longitudinal axis of the belt, and

spaced at varying longitudinal intervals.

16. The method of claim 15 including spacing the grooves such that three sequential spacings between the grooves are all different from each other.

19. An elevator belt, comprising:

a plurality of cords aligned generally parallel to a longitudinal axis of the belt; and

a jacket over the cords and having a plurality of longitudinally spaced grooves on a side of the jacket, the grooves being

disposed at least in part at an oblique angle to the longitudinal axis, and

spaced at varying longitudinal intervals.

21. The elevator belt of claim 19, wherein three sequential ones of the longitudinal intervals are all different from each other.

22. The elevator belt of claim 19, wherein a first portion of each groove is disposed at a first oblique angle to the longitudinal axis and a second portion of each groove is disposed at a second oblique angle to the longitudinal axis.

23. The belt assembly of claim 19, wherein three sequential ones of the spacings between the grooves are all different from one another.

24. The belt of claim 19, wherein said groove comprises a plurality of line segments and at least one of the segments is at the oblique angle relative to the longitudinal axis of the belt.

25. The belt of claim 24, wherein each line segment of a particular one of the grooves is at a different angle relative to the longitudinal axis.

26. The belt of claim 19, wherein the cords comprise steel wires and the jacket comprises an elastomer.

27. The belt of claim 26, wherein the elastomer comprises polyurethane.